Transcending Academic Power Structures: Navigating STEM Misinformation for Undergraduate Learning

Stephanie Mutch, MA, MLIS | STEM Librarian & Instructional Design Specialist | University of Waterloo | smutch@uwaterloo.ca

Kate Mercer, MI, PhD | Engineering & Science Librarian | University of Waterloo | kmercer@uwaterloo.ca

Kari D. Weaver, MLIS, EdD | Learning, Teaching, & Instructional Design Librarian | University of Waterloo | kdweaver@uwaterloo.ca

with special thanks to Janna Kholodova

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LAND ACKNOWLEDGEMENT

This research was conducted by individuals who live and work in Waterloo, Ontario, Canada, which is the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples. The University of Waterloo's main campus is situated on the Haldimand Tract, the land granted to the Six Nations that includes six miles on each side of the Grand River. Our active work toward reconciliation takes place across our campuses through research, learning, teaching, and community building, and is centralized within our Indigenous Initiatives Office. We encourage you to locate yourself within the territory where you reside and work; a great resource for this is Native Land.

INTRODUCTION

For STEM students, the ability to effectively navigate scientific misinformation is a foundational skill, essential to their academic and professional success. However, traditional information literacy training that teaches students to avoid misinformation by using peer-reviewed sources instead of internet search engines fails to prepare them for this task.

Some notable problems with this approach include:

- It risks alienating students because it conflicts with their information seeking experience of Google as a useful tool
- It directs them away from the useful, reliable information available on the broader internet
- It could lead students to believe peer-reviewed sources do not require evaluation
- It does not prepare them for work in professional environments without access to subscription databases

Given these issues, why do many information literacy sessions continue to focus on steering students away from Google and toward peer-reviewed sources to avoid scientific misinformation?

> **Using critical theory, we explore how privileging peer review reinforces academic power structures at the expense of non-academic voices, and suggest an alternative, more inclusive approach to information literacy training.**

CRITICAL THEORY

This analysis takes a broad reading of critical theory, focusing on the following key tenets:

Power dynamics shape our societies, institutions, and social lives.

Questioning the status quo can help us to see whose interests are served by the way things are.

Sociocultural and historical context must be appreciated to fully understand our modern world.

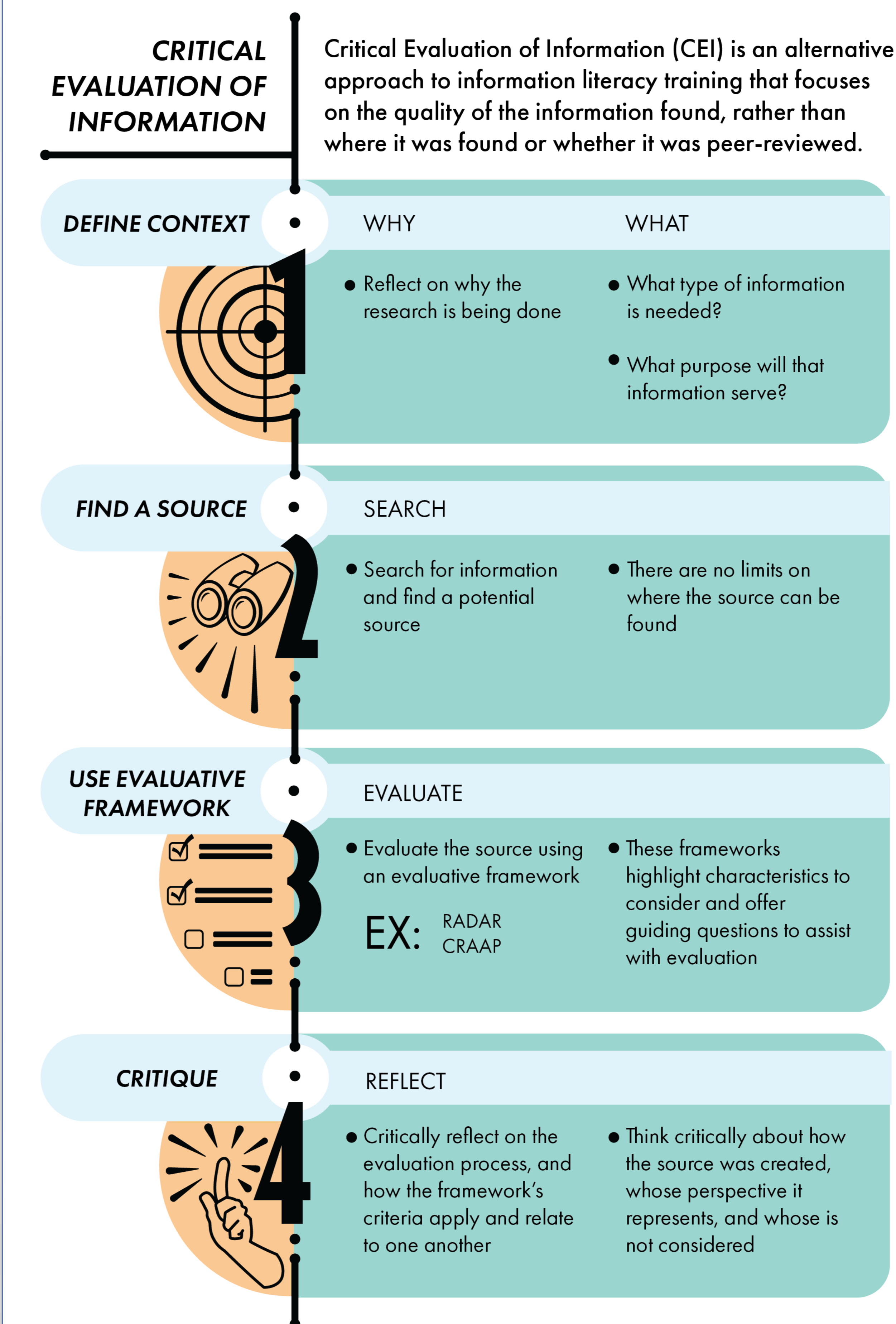**Exposing unjust systems and practices** is a central goal of critical inquiry.

(Bardzell et al., 2018; Leckie et al., 2010)

ANALYSIS

- Privileging peer review is built into academic culture (Mark, 2011). This encourages a self-sustaining system of information production and use that excludes those operating outside of academic power structures.

- It is important to remain cognizant of academia's white, western, colonial, patriarchal history. Time honoured traditions and other processes developed in the past can carry problematic ideologies forward if they remain unquestioned.

- Privileging peer-reviewed sources prioritizes academic voices and ways of knowing. Students are less likely to encounter diverse perspectives, marginalized voices, and Indigenous knowledge when non-academic search engines are framed as inferior.

- Directing students toward scholarly materials by authors from diverse backgrounds is important, but not a replacement for these non-academic materials. Scholarly publications may allow authors to share their knowledge and worldview, but this is done on academia's terms, and only after these authors have spent years learning to excel within the academic context.

AN ALTERNATIVE APPROACH

CRITICAL EVALUATION OF INFORMATION

Critical Evaluation of Information (CEI) is an alternative approach to information literacy training that focuses on the quality of the information found, rather than where it was found or whether it was peer-reviewed.

1 DEFINE CONTEXT

WHY
- Reflect on why the research is being done

WHAT
- What type of information is needed?
- What purpose will that information serve?

2 FIND A SOURCE

SEARCH
- Search for information and find a potential source
- There are no limits on where the source can be found

3 USE EVALUATIVE FRAMEWORK

EVALUATE
- Evaluate the source using an evaluative framework
- These frameworks highlight characteristics to consider and offer guiding questions to assist with evaluation

EX: RADAR CRAAP

4 CRITIQUE

REFLECT
- Critically reflect on the evaluation process, and how the framework's criteria apply and relate to one another
- Think critically about how the source was created, whose perspective it represents, and whose is not considered

KEY TAKEAWAYS

- Information literacy instruction that teaches students to avoid misinformation by deferring to peer-reviewed sources is more beneficial to the academy than it is for students
- Critical evaluation of information gives students the freedom to explore a wider range of resources where they are more likely to encounter diverse perspectives, viewpoints, and ways of knowing
- Teaching students how to critically evaluate information provides them with a more practical skillset that they can use whenever they encounter information, whether in their personal lives, while completing their studies, or after graduation when they lose access to subscription databases.

NEXT STEPS

Future research will involve collecting data to illustrate the impact of CEI on student learning, specifically:

- The impact of CEI instruction on students' enthusiasm for research
- The quality of sources students choose following CEI instruction
- The range of sources and perspectives students use in their work following CEI instruction

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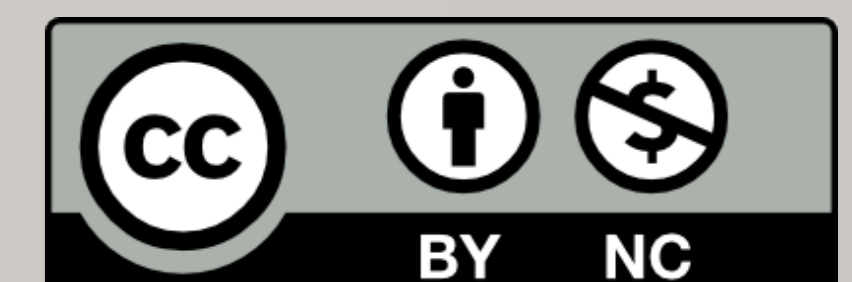
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